

68
N91-18981

1990

NASA/ASEE SUMMER FACULTY FELLOWSHIP PROGRAM

MARSHALL SPACE FLIGHT CENTER
THE UNIVERSITY OF ALABAMA

ESTABLISHMENT OF A STRAIN ANALYSIS CAPABILITY USING
PHOTOELASTIC COATINGS

Prepared By: Samuel C. Gambrell, Jr.
Academic Rank: Professor
University and Department: University of Alabama, Tuscaloosa
Engineering Mechanics

NASA/MSFC:

Laboratory: Structures and Dynamics
Division: Structural Test
Branch: Structural Test

MSFC Colleague: Mr. G.B. Waggoner
Mr. D.E. Snoddy

Contract No. NGT-01-002-099
The University of Alabama

In accordance with the Research Plan prepared at the beginning of the Fellowship Program, my summer activities consisted of:

1. training personnel of the Structural Test Division of the Structures and Dynamics Laboratory in the theory and practice of strain analysis using photoelastic coatings; and
2. performing strain analysis using photoelastic coatings on appropriate test articles.

In support of these activities, the following actions have been taken:

1. equipment and supplies necessary for strain analysis using photoelastic coatings were specified, purchased, and checked out;
2. four engineers were trained in the theory and practice of strain analysis using photoelastic coatings;
3. four technicians were trained in the practice of preparing and applying photoelastic coatings to both curved and flat surfaces;
4. in addition to the final program seminar, three seminars on the fundamentals and use of photoelastic coatings were presented to a total of 43 members of the various laboratories at MSFC;
5. a photoelastic coating was applied to and used in a test of a thrust vector control corner section;
6. to further assist engineers with use and understanding of photoelastic coatings, fifteen journal articles were located and copied, and camera settings for photographing fringe patterns were determined and recorded;
7. two proposals for (a) providing technical assistance in strain analysis at MSFC and (b) testing of selected components/assemblies at the University of Alabama in Tuscaloosa have been written for submission to NASA.

